

What is claimed is:

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Sub 7 Claim 1. A flameproof thermoplastic resin composition substantially free of phenolic resin and red phosphorous comprising:

(A) about 40 - 95 parts by weight of a rubber modified styrene-containing resin comprising:

(a1) about 20 - 95 % by weight of a styrene-containing graft copolymer resin containing about 19 - 50 % by weight of acrylonitrile in the copolymer excluding rubber and

(a2) about 5 - 80 % by weight of a styrene-containing copolymer containing about 19 - 50 % by weight of acrylonitrile;

(B) about 5 - 60 parts by weight of a polyphenylene ether resin;

(C) about 2 - 40 parts by weight of a compatibilizer comprising

(c1) a styrene-containing copolymer containing about 5 - 18 % by weight of acrylonitrile in the copolymer per 100 parts by weight of the sum of (A) and (B) or

(c2) a styrene-containing graft copolymer having up to about 60% by weight of rubber wherein the compatibilizer contains about 5 - 18 % by weight of acrylonitrile in the copolymer excluding rubber, per 100 parts by weight of the sum of (A) and (B); and

(D) about 5 - 30 parts by weight of an aromatic phosphoric acid ester per 100 parts by weight of the sum of (A) and (B),

wherein the resin composition contains less than 3% by weight of polycarbonate based on the total weight of the composition.

Claim 2. A flameproof resin composition according to claim 1 comprising about 60 - 85 parts by weight of (A), about 15 - 40 parts by weight of (B), about 5-20 parts by weight of (C), and about 5-20 parts by weight (D).

Claim 3. A flameproof resin composition according to claim 2 wherein (A) is comprised of about 25 - 70 % by wt. of (a1) and about 30 - 75 % by wt. of (a2).

Claim 4. A flameproof resin composition according to claim 3 wherein (a1) and (a2) each contain about 20-35 % by weight of acrylonitrile.

5 Claim 5. A flameproof resin composition according to claim 2 wherein compatibilizer (C) contains about 10-18 % by weight of acrylonitrile.

Claim 6. The flameproof thermoplastic resin composition according to claim 2, wherein said polyphenylene ether (B) is poly(2,6-dimethyl-1,4-phenylene) ether.

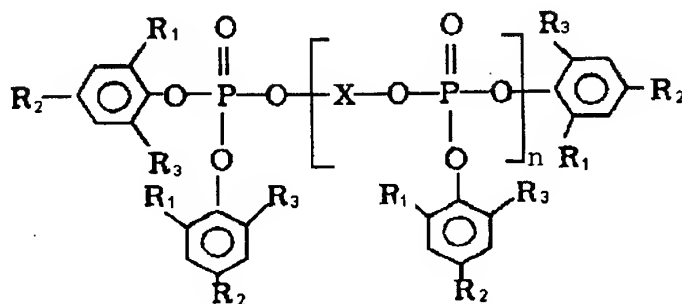
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Claim 7. A flameproof resin composition according to claim 1 wherein the resin composition contains less than 2 % by weight polycarbonate based on the total weight of the composition.

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Claim 8. A molded article produced from the flameproof thermoplastic resin compositions according to claim 1.

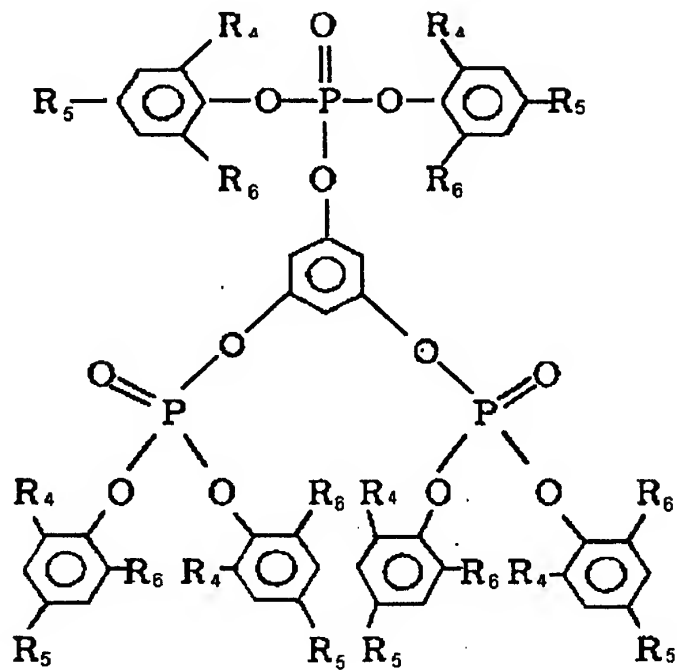
Claim 9. The flameproof thermoplastic resin composition according to claim 1, wherein said aromatic phosphoric acid ester is represented by following formula:



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wherein R₁, R₂ and R₃ independently of one another are hydrogen or C₁-C₄ alkyl; X is a dialcohol derivative selected from the group consisting of resorcinol, diphenol, hydroquinol, bisphenol-A and bisphenol-S; and n is 0 - 4.

Claim 10. The flameproof thermoplastic resin composition according claim 1, wherein said aromatic phosphoric acid ester is represented by following formula:



wherein R₄, R₅ and R₆ are hydrogen or C₁-C₄ alkyl.

5 Claim 11. The flameproof thermoplastic resin composition as defined in claim 1, wherein said aromatic phosphoric acid ester (D) is triphenylphosphate.

10 Claim 12. The flameproof thermoplastic resin composition as defined in claim 1, wherein said aromatic phosphoric acid ester is selected from the group consisting of tri(2,6-dimethyl phenyl) phosphate, tri(2,4,6-trimethyl phenyl) phosphate, tri(2,4-ditertiary butyl phenyl) phosphate, tri(2,6-ditertiary butyl phenyl) phosphate, resorcinolbis(diphenyl) phosphate, resorcinolbis (2, 6-dimethyl phenyl) phosphate, resorcinolbis(2,4-ditertiary butyl phenyl) phosphate, hydroquinol (2,6-dimethyl phenyl) phosphate, hydroquinol(2,4-ditertiary butyl phenyl) phosphate.

Claim 13. The flameproof thermoplastic resin composition as defined in claim 1, wherein said aromatic phosphoric acid ester is tri(2,6-dimethyl phenyl) phosphate

Claim 14. The flameproof thermoplastic resin composition as defined in claim 9, wherein said aromatic phosphoric acid ester (D) has a melting point of 90 °C or more.

Claim 15. A flameproof thermoplastic resin composition comprising:

(A) about 40 - 95 parts by weight of a rubber modified styrene-containing resin comprising

(a₁) about 20 - 95 % by weight of a styrene-containing graft copolymer resin containing about 19 - 50 % by weight of acrylonitrile in the copolymer excluding rubber and

(a₂) about 5 - 80 % by weight of a styrene-containing copolymer containing about 19 - 50 % by weight of acrylonitrile;

(B) about 5 - 60 parts by weight of a polyphenylene ether resin;

(C) about 2 - 40 parts by weight of a compatibilizer comprising

(c₁) a styrene-containing copolymer containing about 5 - 18 % by weight of acrylonitrile in the copolymer per 100 parts by weight of the sum of (A) and (B) or

(c₂) a styrene-containing graft copolymer having up to about 60% by weight of rubber wherein the compatibilizer contains about 5 - 18 % by weight of acrylonitrile in the copolymer excluding rubber, per 100 parts by weight of the sum of (A) and (B); and

(D) about 5 - 30 parts by weight of an aromatic phosphoric acid ester per 100 parts by weight of the sum of (A) and (B),

wherein the resin composition contains about 0 % by weight of phenolic resin, red phosphorous, and silicone resin based on the total weight of the composition.

Claim 16. A flameproof resin composition according to claim 15 comprising about 60 - 85 parts by weight of (A), about 15 - 40 parts by weight of (B), about 5-20 parts by weight of (C), and about 5-20 parts by weight (D).

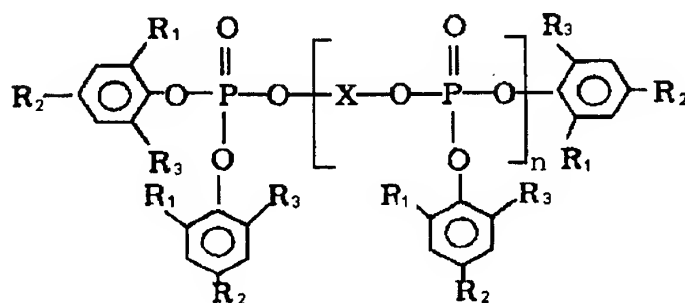
Claim 17. A flameproof resin composition according to claim 16 wherein (A) is comprised of about 25 - 70 % by weight (a1) and about 30 - 75 % by weight (a2).

5 Claim 18. A flameproof resin composition according to claim 17 wherein (a1) and (a2) each contain about 20-35 % by weight of acrylonitrile.

Claim 19. A flameproof resin composition according to claim 16 wherein (c1) or (c2) in compatibilizer (C) contains about 10-18 % by weight of acrylonitrile.

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Claim 20. The flameproof thermoplastic resin composition according to claim 16, wherein said aromatic phosphoric acid ester is represented by following formula:



15 wherein R₁, R₂ and R₃ independently of one another are hydrogen or C₁-C₄ alkyl; X is a dialcohol derivative selected from the group consisting of resorcinol, diphenol, hydroquinol, bisphenol-A and bisphenol-S; and n is 0 - 4.

20 Claim 21. A flameproof resin composition according to claim 15 wherein the resin composition contains less than about 2% by weight of polycarbonate.

Claim 22. A molded article produced from the flameproof thermoplastic resin compositions according to claim 15.

Claim 23. A flameproof thermoplastic resin composition substantially free of phenolic resin and red phosphorous comprising:

(A) about 40 - 95 parts by weight of a rubber modified styrene-containing resin comprising

(a1) about 20 - 95 % by weight of a styrene-containing graft copolymer resin containing about 19 - 50 % by weight of acrylonitrile in the copolymer excluding rubber and

(a2) about 5 - 80 % by weight of a styrene-containing copolymer containing about 19 - 50 % by weight of acrylonitrile;

(B) about 5 - 60 parts by weight of a polyphenylene ether resin;

(C) about 2 - 40 parts by weight of a compatibilizer comprising

(c1) a styrene-containing copolymer containing about 5 - 18 % by weight of acrylonitrile in the copolymer excluding rubber, per 100 parts by weight of the sum of (A) and (B) or

(c2) a styrene-containing graft copolymer having up to about 60% by weight of rubber wherein the compatibilizer contains about 5 - 18 % by weight of acrylonitrile in the copolymer excluding rubber, per 100 parts by weight of the sum of (A) and (B); and

(D) about 5 - 30 parts by weight of an aromatic phosphoric acid ester per 100 parts by weight of the sum of (A) and (B),

wherein the resin composition contains about 0% by weight silicone resin based on the total weight of the composition.

Claim 24. A flameproof thermoplastic resin composition substantially free of phenolic resin and red phosphorous comprising:

(A) about 40 - 95 parts by weight of a rubber modified styrene-containing resin comprising

(a1) about 20 - 95 % by weight of a styrene-containing graft copolymer resin containing about 19 - 50 % by weight of acrylonitrile in the copolymer excluding rubber and

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- (a2) about 5 - 80 % by weight of a styrene-containing copolymer containing about 19 - 50 % by weight of acrylonitrile;
- (B) about 5 - 60 parts by weight of a polyphenylene ether resin;
- (C) about 2 - 40 parts by weight of a compatibilizer comprising
- (c1) a styrene-containing copolymer containing about 5 - 18 % by weight of acrylonitrile in the copolymer excluding rubber, per 100 parts by weight of the sum of (A) and (B) or
- (c2) a styrene-containing graft copolymer having up to about 60% by weight of rubber wherein the compatibilizer contains about 5 - 18 % by weight of acrylonitrile in the copolymer excluding rubber, per 100 parts by weight of the sum of (A) and (B); and
- (D) about 5 - 30 parts by weight of an aromatic phosphoric acid ester per 100 parts by weight of the sum of (A) and (B),
- wherein the resin composition contains less than 3 % by weight of polycarbonate based on the total weight of the composition, wherein the resin composition is produced in a two-step process comprising
- a first step (i) preparing a master batch containing about 40 - 95 parts by weight of polyphenylene ether (PPE) (B), about 5 - 60 parts by weight of compatibilizer (C) having about 5 - 18 % by weight of acrylonitrile content, and about 0 - 30 parts by weight of aromatic phosphoric acid ester compound (D) at about 250 - 300 °C of molding temperature; and
- a subsequent second step (ii) adding a rubber modified styrene-containing resin (A) and aromatic phosphoric acid ester compound (D) to the master batch and extruding the resulting mixture at about 200 - 260 °C.

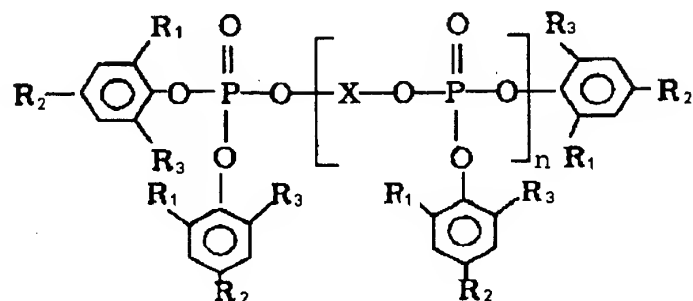
Claim 25. A method of producing a flameproof thermoplastic resin composition substantially free of phenolic resin and red phosphorous and contains less than 3 % by weight of polycarbonate based on the total weight of the composition wherein the resin composition comprises

(A) about 40 - 95 parts by weight of a rubber modified styrene-containing resin comprising

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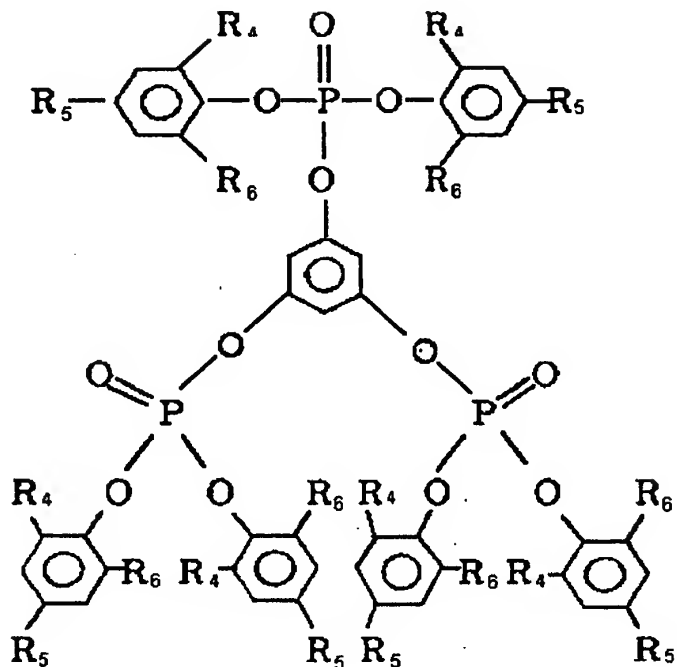
- (a1) about 20 - 95 % by weight of a styrene-containing graft copolymer resin containing about 19 - 50 % by weight of acrylonitrile in the copolymer excluding rubber and
- (a2) about 5 - 80 % by weight of a styrene-containing copolymer containing about 19 - 50 % by weight of acrylonitrile;
- (B) about 5 - 60 parts by weight of a polyphenylene ether resin;
- (C) about 2 - 40 parts by weight of a compatibilizer comprising
- (c1) a styrene-containing copolymer containing about 5 - 18 % by weight of acrylonitrile in the copolymer excluding rubber, per 100 parts by weight of the sum of (A) and (B) or
- (c2) a styrene-containing graft copolymer having up to about 60% by weight of rubber wherein the compatibilizer contains about 5 - 18 % by weight of acrylonitrile in the copolymer excluding rubber, per 100 parts by weight of the sum of (A) and (B); and
- (D) about 5 - 30 parts by weight of an aromatic phosphoric acid per 100 parts by weight of the sum of (A) and (B),
- wherein the method is a two-step process comprising
- a first step (i) preparing a master batch containing about 40 - 95 parts by weight of polyphenylene ether (PPE) (B), about 5 - 60 parts by weight of compatibilizer (C) and about 0 - 30 parts by weight of aromatic phosphoric acid ester compound (D) at about 250 - 300 °C of molding temperature; and then
- a subsequent second step (ii) adding a rubber modified styrene-containing resin (A) and aromatic phosphoric acid ester compound (D) to the master batch and extruding the resulting mixture at about 200 - 260 °C.

Claim 26. The method according to claim 25, wherein said aromatic phosphoric acid ester is represented by following formula:



wherein R_1 , R_2 and R_3 independently of one another are hydrogen or C_1 - C_4 alkyl; X is a dialcohol derivative selected from the group consisting of resorcinol, diphenol, hydroquinol, bisphenol-A and bisphenol-S; and n is 0 - 4.

Claim 27. The method according claim 25, wherein said aromatic phosphoric acid ester is represented by following formula:



wherein R₄, R₅ and R₆ are hydrogen or C₁-C₄ alkyl.

Claim 28. The method according to claim 25 wherein said aromatic phosphoric acid ester compound has a melting point of 90 °C or more.

Claim 29. The method according to claim 25 wherein said polyphenylene ether resin is poly (2,6- dimethyl-1,4-phenylene) ether.

Claim 30. The method according to claim 25 wherein the compatibilizer (C) comprises (c2).

Claim 31. The method according to claim 25 wherein the styrene-containing copolymer (c1) or graft styrene-containing copolymer (c2) further comprises a monomer selected from the group consisting of methacrylate, maleic anhydride and phenyl maleimide.

Claim 32. The method as defined in claim 25 wherein component (A) is comprised of an ABS resin, an acrylonitrile-acryl rubber-styrene (AAS) resin, an acrylonitrile-ethylenepropylene rubber-styrene (AES) resin, or a mixture thereof.

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